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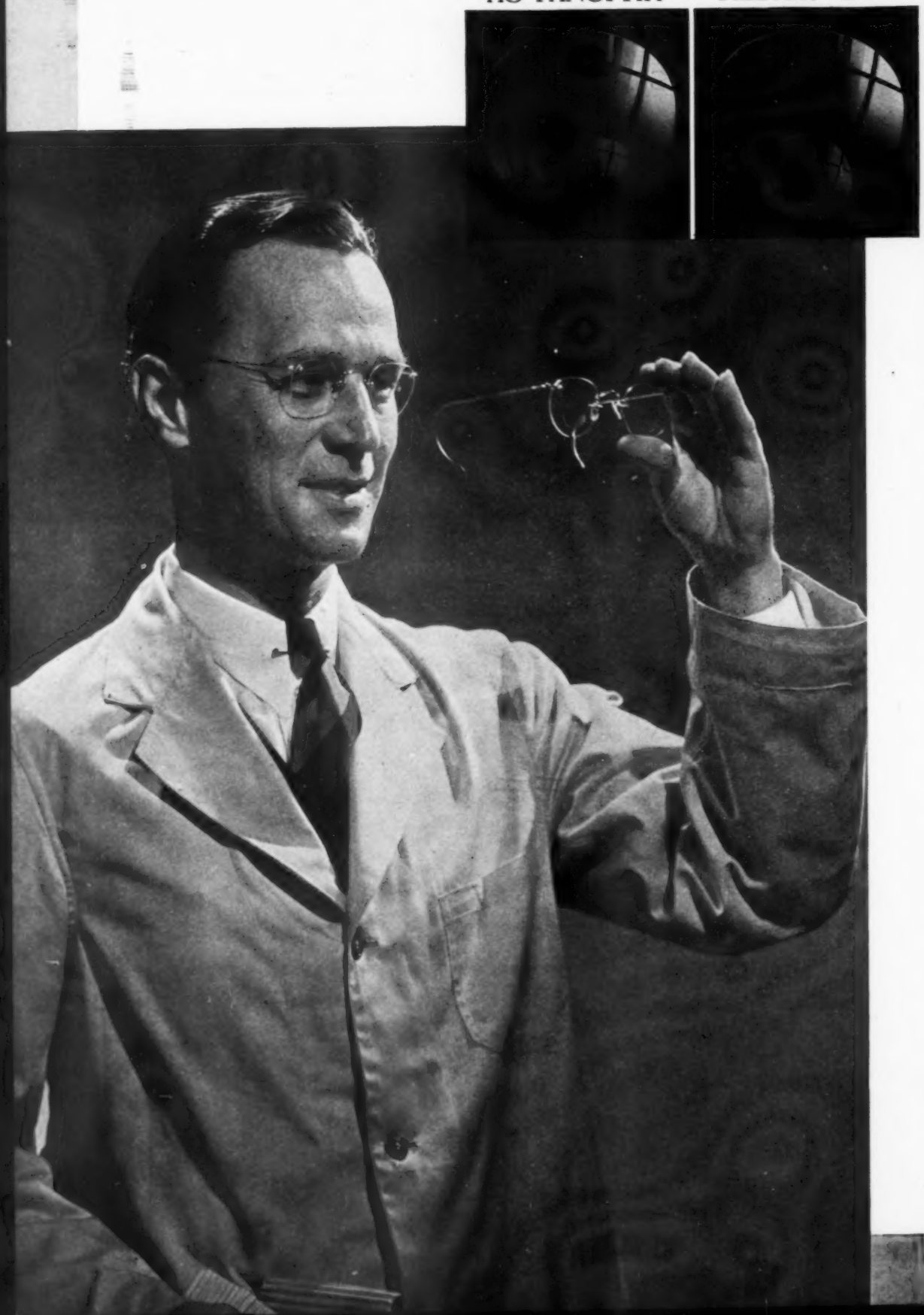

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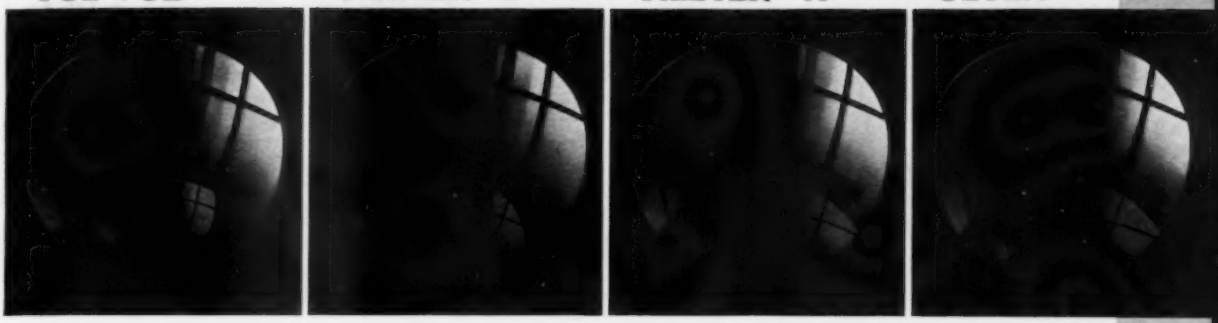

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MINNESOTA ACADEMY OF OPTOMETRY MEETING

SEPTEMBER 26 and 27, 1937

CURTIS HOTEL — MINNEAPOLIS, MINNESOTA

SUNDAY, SEPTEMBER 26*

10:00 A. M. DR. JOSEPH FRANK, New Prague, Minnesota
President's Address

10:15 A. M. DR. M. A. BURSACK, Fargo, North Dakota
Photoptic and Scotoptic Vision

11:00 A. M. DR. CAREL C. KOCH, Minneapolis, Minnesota
Newer Developments in Clinical Subjective Testing

2:00 P. M. DR. ROBERT BEST, Fairmont, Minnesota
Referred Cases and Internal Ocular Pathology

3:00 P. M. DRS. WM. HENNING and M. A. BURSACK, Fargo, North Dakota
The Interpretation of Ocular Symptoms

4:00 to 6:00 P. M. Round Table Discussion of Optometry's Problems.
Discussion by Drs. Jack I. Kurtz, Robert Best, Carel C. Koch, Guy L. Du Plesis, Jos. Frank, E. J. Cummins, and Jennie Olander.

MONDAY, SEPTEMBER 27, 1937*

9:00 A. M. to 11:00 A.M. Biographic Clinics
DR. GUY DuPLESSIS, Presiding
Analysis, Diagnosis, Prognosis of Cases Presented by Fellows of the Academy.

11:00 A. M. DR. J. I. KURTZ, Minneapolis, Minnesota.
Research Report on Ocular Fatigue.

12:30 to 2:00 P. M. Luncheon and Business Meeting

2:30 P. M. PROF. CHAS. SHEARD, Ph.D., Division of Biophysical Research, The Mayo Foundation, Rochester, Minnesota.
Analytical Procedures and Methods of Management in Latest and Manifest Strabismus.
Room 115, Psychology Building, University of Minnesota

4:30 P. M. PROF. WM. T. HERON, Ph.D., Psychology Department, University of Minnesota, Minneapolis, Minnesota
The Ocular Clinical Application of Conditioned Reflexes
Room 115, Psychology Building, University of Minnesota

* All Sessions are open to Fellows of the Academy and to others by invitation only.

AMERICAN JOURNAL OF OPTOMETRY

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OPTOMETRY, OPHTHALMOLOGY AND THE PUBLIC*

Jack I. Kurtz, B.S., A.O., M.A., F.A.A.O.
Minneapolis, Minn.

For any profession to develop and exist, there must be a distinct public need for its services. Optometry, medicine, dentistry and osteopathy developed because they each render a distinct public service. A service which, over a period of years, has proven itself to be of value to the people of this country. To enable these professions to better serve the public, these professions were given legal recognition which now serves the dual purpose of, first, protecting the members of a profession from being encroached upon by others who have not had the educational qualifications which enable them to render the particular service of that profession and, second, to protect the public from exploitation by individuals claiming to possess the qualifications yet who have not shown to the public at large that they have them by appearing before the examining boards to prove their fitness to do the work in question.

Optometry and dentistry to a very marked extent have had a similar historical background and development. They both had their beginnings in surroundings and environments which do not begin to resemble the professional office environment of its present day practitioners. Dentistry as an individual art and science, and as an independent profession can now point to about seventy-five years of development in its technical and educational fields, although it is only during the last thirty of these years that it has enjoyed the fruits of the undisputed possession of the problems of the oral cavity, along with their correction. Optometry, on the other hand, while springing from a much older background, has developed more slowly. The first optical organization among English speaking people was the Worshipful Company of Spectacle Makers, incorporated by Royal Charter in England in 1629. This society is still in existence today and is one of the strong English optometric educational organizations. In both professions the educational qualifications have been raised from time to time, and while this progress was made somewhat more rapidly in dentistry than in optometry, both now have as their minimum a four-year college course.

*Submitted for publication June 15, 1937.

And while on this matter of educational training of those engaged in ocular work it might be well to mention that outstanding and important phase of every ocular examination having to do with the diagnosis of disease. While it is true that the percentage of cases having ocular diseases is very low as compared to the large number of non-pathological eye cases, some pathology does exist, and of course this must be recognized by practitioners doing the examining. Diseases of the eye are diagnosed in several ways, one having to do with a searching examination of the interior of the eye by means of the ophthalmoscope. Another is accomplished by means of a thorough examination of the anterior portion of the eye wherein a number of reactions and inspections are made. A third has to do with the visual fields and an investigation of these. All optometrists are trained to make these tests. Trained for a period of years in the class rooms of their Universities and Colleges and in the large School Clinics, where these tests are made on patients themselves under the direction of clinical professors having both medical and optometrical training. This ocular diagnostic training does not take place for but several weeks or at the most several months, but actually takes place for several years during which time the student familiarizes himself with every detail of these diagnostic techniques under all types of clinical and office practice. Every optometrist, and this has been true for a great number of years, has had this training and every man has passed examinations, both at school and before his State Board of Optometry to prove his proficiency in this vital diagnostic phase of eye work.

From the legislative standpoint both dentistry and optometry gained legal recognition in every state in the Union, and at first both exempted the members of the medical profession from the provisions of their respective laws. Dentistry, however, after a series of very bitter fights with various medical societies was able to oust the medical man from the oral field. Optometry, on the other hand, centering its attention on ocular refraction, at first, welcomed the participation of medical men in eye work. The question may now be properly asked, just why did it take optometry longer to reach professional maturity than it did dentistry? The answer to this question is that dentistry having passed its laws somewhat earlier than optometry, has now largely gotten rid of its practitioners who were licensed to practice by exemption, while optometry in some states at least has a number of these older men who were merchandising optical material when the law was first passed and who have been permitted to continue this practice because no method could be found to prohibit them from so doing. The mere passage of time will eliminate much of this type of optometric practice.

Thirty-six years ago, when the first optometry law was passed, there were very few medical men who practiced optometry, for that is exactly what a medical practitioner does when he refracts and prescribes a correction in the form of glasses for a patient. At that time there were

approximately 20,000 optometrists supplying visual eye care and about 400 ophthalmologists engaged in the practice of ophthalmology, these largely centered in the major cities of this country.

As optometry advanced its educational and professional standards, more and more medical practitioners began to practice optometry, taking advantage of the exemption clauses in the optometry laws. This resulted gradually, in the development of a dual group practicing optometry under the names of optometry and ophthalmology. In fairness it must be said that a few medical practitioners did go to the cost of spending the time and money necessary to acquire a knowledge of refraction before they started to refract. The unescapable truth of the matter is, however, that the great majority of ophthalmologists or oculists as they are sometimes called, entered the field of optometry with their only preparation a three, or at the most, a six months' course in eye, ear, nose and throat work given in the dispensary of some Philadelphia or Chicago or New York hospital. In other words, with practically no knowledge of the subject at all; as the medical course, even on its present six-year basis, devotes but 50 hours to the entire subject of the eye, a far too short a time to learn anything of value to a practitioner who is to attempt to work on that organ. And it must also be remembered, that the great majority of medical men in practice today are not graduates of a six-year medical course, but are rather graduates of two, three and four year medical courses, as the six-year course is a relatively new thing and in existence in only a few of the best medical colleges. Many states still only require four years of medical training, and at best, that is all that any students still get even with a so-called six-year course, as the first two years are entirely academic training not even given in the medical school. To be sure, the student is in the university for six years, but he is spending only the last four of these getting the medical training he applies for, and that he is there to get. In contrast to this the optometric college of today is giving four years of optometric schooling and training. This, to be sure, has not always been true either, yet for the last twenty years or more all optometric colleges have had two-year courses as their minimum course and most have been on a full-time three and four-year basis.

Some of the leading medical educators and ophthalmologists like Professor F. C. Todd, recognized this problem as early as 1901 and tried to cope with it, as the writer shall show in the succeeding pages. It was established historically and legally that the optometrists were the first to practice ocular refraction in this country and that they taught the art of refraction to the first medical men in the United States, who entered the practice of optometry.

The committee of costs of medical care (whose chairman was Ray Lyman Wilbur, M.D., Department of Interior), made an exhaustive study of the optometry question and its findings were published in 1929

in monograph number 15, by Louis S. Reed, Ph.D., a member of the committee. This committee[10] found that "The existence of optometry on its present basis is due to the failure of the medical profession to recognize the importance of this field and its failure to provide needed services. The training received by the medical students does not qualify them to do refraction. The curriculum devotes relatively little time to the eye." The committee points out this paradox when it states in its report (page 47) that "All the optometry laws exempt physicians from their restrictions . . . while optometry is not considered the practice of medicine, any physician is considered qualified to practice optometry." We might state for the information of the committee and others interested in this subject that these exemptions were not put in at the demand or insistence of the optometrists.

As the number of medical men who were practicing optometry increased, that group became vocal and even in some instances actually began to challenge the right of the members of the optometric group from practicing its own profession. A profession which the medical men had entered by exemption, never proving to the public or to any one at all, their fitness to do the work. In the meantime, all optometrists were being examined by state boards, which were set up to give examinations to the graduates of optometric colleges before they were permitted to examine eyes and prescribe for the visual abnormalities of patients.

In challenging the optometrist, regarding his ability to refract, one of the chief medical arguments was that the optometrist was not qualified to do this work as he did not, or could not use a cycloplegic. To aid in this sort of an argument the statement was sometimes heard that it was "unsafe to entrust the nation's eyesight to the optometrist because in many cases he examined, he did not use drops." This of course was given out for the public's consumption to assist the medical man if possible in the matter of increasing *his practice*. The fact that optometrists were trained to do a first-class scientific job of ocular refraction in the great majority of cases without resorting to the use of a cycloplegic was ignored, even by medically trained men who knew the facts, and who themselves were not using "drops" in anything like all of their refractive cases.

The scientific value of a cycloplegic has never been proven experimentally. In searching the ophthalmological literature[1] one fails to find any record of it. This matter of "drops" or what are more properly called cycloplegics is one that has been stressed far out of its natural and proper importance. This is a fact that is well known to all ophthalmologists, oculists and optometrists. The writer feels himself to be a particularly good judge of this vital question, as he has practiced ocular refraction using "drops" or cycloplegics for a considerable period of time, and has also practiced without use of the drug, and therefore can compare the results obtained by the two methods.

During the World War, the writer was connected with the eye department of one of the United States Base Hospitals in this country. Here I had the opportunity to work with some of the leading ophthalmologists who were serving as refractionists at this base hospital. Here the refractive work was largely done under a cycloplegic and I was surprised to find that of these lieutenants, captains, majors, etc., who were doing this refractive work, that there were only two men whose refractive findings working on the same case, that would agree, or even come near to agreement. As for the rest of them, if several officers would refract a certain questionable case, each one of them would have an entirely different result or set of refractive findings even though they all used cycloplegics or "drops."

Of course, to one who had received his training as an optometrist at Ohio State University, as the writer had done, this did not seem strange at the time, as I knew, as do all eye men, that the use of a cycloplegics or "drops" does not make for ease in refraction. And I also knew that whenever the drops were used that the refraction had to be completed at some future day when the effects of these had disappeared so that the acceptable findings could be then estimated, as no finding gotten under a cycloplegic can be used unless one wishes to make an arbitrary deduction from it, which is very unscientific. I therefore was surprised to find that after the war that some of these very ophthalmologists, who had such a difficult time making their cycloplegic refractions agree while in the service, were claiming that only accurate work could be done while using a cycloplegic. Certainly some of the work that we did while in the service was accurate. At least I hope it was, but I am sure we had a larger number of complaints from the soldiers examined by us each with a cycloplegic, that the average optometrist has in his own office where but few cases call for the use of the drug.

Another thing which surprised me in my army work with medical men who were attempting to do eye work was the day in and day out display of lack of knowledge of matters of ocular refraction by medical men who were supposed to be eye specialists. Many of these men were good surgeons, but their training had been largely devoted to the therapeutic treatment and surgical sides of eye care and the refractive training they had received, as evidenced by the type of refractive work they did. was very little indeed. This was the first opportunity the writer had to get *first* hand information of refractive conditions that existed in the two groups at that time and which I say in many cases still exist today.

Since that time, I have been practicing as an optometrist and have had many opportunities to observe the work of certain ophthalmologists by working on eye cases which were formerly cared for by these ophthalmologists. The writer will mention here only a few of the many cases he has on record, pointing out what was unsatisfactorily prescribed by the

ophthalmologist and then what the case actually needed and was given by the writer, which brought the desired results; *i.e.*, relief from symptoms. All of these cases herein reported have been contacted at periods varying from one year to three years following the application of the work done by the writer and in every case the patient reported complete relief and satisfaction. These cases are not presented with the view of belittling or ridiculing the work of the ophthalmological practitioners, whose cases are herein cited, or to display the superiority of an optometric non-cycloplegic refraction over that of a cycloplegic one. This is far from the case. The writer wishes to merely present the facts objectively as this may assist us all in finding the solution of a problem which should and must be solved properly for the sake of the public, as well as the men in the professions as now practiced by optometry and ophthalmology.

Case 1. Miss M., age 31, office worker. Complained of poor vision, headaches and "blind spells." Had to stay away from the office during these spells. She had been under the care of several of the ophthalmologists of her home city. The last correction which had been given her after examining her with a cycloplegic was as follows:

O.D. +1.00 D. Cyl. x 180. V.A. = 20/200.
O.S. +4.00 D. Cyl. x 135. V.A. = 20/200.

A non-cycloplegic refraction revealed the need for the following correction:

O.D. —10.00 D. Sph. V.A. = 20/32.
O.S. —8.00 D. Sph. ⌒ +4.00 D. Cyl. x 75. V.A. = 20/24.

Note the difference in visual acuity (V.A.). The visual acuity of the right eye came up from 20/200 to 20/32 and the left came up from 20/100 to 20/24. This patient has used this correction for the past several years with complete comfort.

Case 2. Mr. S., age 56, office executive. Called at the office for an examination complaining that his eyes felt tired and uncomfortable when used for near work. He had been refracted by an ophthalmologist under a cycloplegic about four months ago and the following correction had been prescribed which he had not been able to use with comfort.

O.D. +0.50 D. Sph. V.A. = 20/20.
O.S. +0.25 D. Sph. V.A. = 20/20.
Add O.U. in bifocal form, +2.25 D. Sph.
The non-cycloplegic refraction revealed the following:
O.D. +1.50 D. Sph. V. A. = 20/20.
O.S. +1.25 D. Sph. V.A. = 20/20.
Add O.U. for reading +2.00 D. Sph.

Patient had 6△ of esophoria at 6 meters and 10△ of esophoria at 33 cm. Also 2△ of right hyperphoria.

The non-cycloplegic findings were prescribed along with a base up and down prism divided before the two eyes and the patient used this correction with comfort for three years before he had to have it made stronger as his presbyopia increased. In this case it is of interest to note that the non-cycloplegic examination revealed a diopter more hyperopia than was revealed by the cycloplegic examination. It might also be added here that none of the tests for determining the accommodative-convergence relationships were made by the ophthalmologist who first worked on this case.

Case 3. Mr. A., age 28, school teacher. Unable to use his eyes at the near point. Had been under the care of an ophthalmologist for past three years. His latest correction, done under a cycloplegic was as follows:

O.D. —1.25 D. Sph. ⌒ —1.25 D. Cyl. x 180. V.A. = 20/20.

O.S. —2.00 D. Sph. ⌒ —0.50 D. Cyl. x 15. V.A. = 20/20.

The writer using a non-cycloplegic refractive technique got the following findings:

Static skiametry.

O.D. —0.50 D. Sph. ⌒ —1.25 D. Cyl. x 180.

O.S. —1.50 D. Sph.

Dynamic skiametry.

O.D. +3.00 D. Sph. ⌒ —1.25 D. Cyl. x 180.

O.S. +1.00 D. Sph.

The phoria findings were, uncorrected 8△ of esophoria and with his former minus correction the esophoric increased to 16△. I then prescribed the following, which was used with complete comfort.

O.D. —0.50 D. Sph. ⌒ —1.25 D. Cyl. x 180. V.A. = 20/20.

O.S. —1.50 D. Sph. V.A. = 20/20.

Add O.D. +2.00 D. Sph. O. S. +1.00 D. Sph.

This bifocal correction was used with complete comfort, the patient reporting at ninety day intervals for recheck.

Case 4. Miss E., age 24. Complained of eye pains, headaches and dizziness. Also an inability to use the eyes for near work. She had never used glasses and in a non-cycloplegic examination it was determined that while there was a little hyperopia present, her trouble was due largely to a large and varying amount of exophoria as well as some 14△ of left hyperopia at the near-point. Orthoptic treatments were suggested but to give some immediate relief a temporary set of treatment prisms were made prescribed in a spectacle frame for use until the treatments would improve the balance of the extra-ocular muscles. The treatments started at once with the patient wearing the following treatment correction:

O.D. Plano Prism, 6△ Base-in ⌒ 3△ Base-up.

O.S. Plano Prism, 6△ Base-in ⌒ 3△ Base-down.

After wearing the glasses for some time in addition to oculo-prism treatments, the patient reported feeling splendid and that all former

symptoms complained of had disappeared. The prescription had been reduced several times during a period of one year until it finally read:

O.D. Plano Prism, 3△ Base-in ⌒ 1△ Base-up.

O.S. Plano Prism, 3△ Base-in ⌒ 1△ Base-down.

The patient at the time of the last examination complained of some internal trouble of which no satisfactory diagnosis was arrived at after being examined by no less than nine different medical practitioners. The patient was then advised to undergo a thorough physical examination and the writer recommended her to go to one of the most reputable medical clinics in the country. The advice was followed, and after being thoroughly examined the diagnosticians at this clinic were unable to find the seat of the trouble. During the course of the general examination she was sent to the ophthalmologic department to have her eyes examined. There she was advised that her glasses did not fit her and was given another prescription, which was:

O.D. —0.25 D. Sph. ⌒ —0.25 D. Cyl. x 180. V.A. = 20/20.

O.S. +0.50 D. Sph. ⌒ —1.00 D. Cyl. x 180. V.A. = 20/20.

Upon her return to Minneapolis she called at the writer's office complaining that she was unable to wear the glasses prescribed to her at the clinic and wished to have a pair made up similar to her last prescription. The writer, however, urged her to try and wear the glasses prescribed by the ophthalmologists at the clinic and not to discard them before she had given them a fair trial. She was reasonable and again listened to our advice, but after many weeks of painful trial she had to go back to our compound prismatic prescription, which gave her relief at once.

Case 5. Mrs. S., age 40, complained of insomnia, inability to read either with or without her glasses and severe headaches. The insomnia had been present for the past fourteen months. The glasses she wore at that time were prescribed a year previous by an ophthalmologist, who enjoys a considerable reputation. He was a colonel in the United States army medical corps during the World War and has lectured on some occasions at the section of ophthalmology of the American Medical Association and is also a frequent contributor to the national ophthalmological publications. These glasses neutralized

O.D. +0.75 D. Sph. ⌒ +1.00 D. Cyl. x 90. V.A. = 20/20.

O.S. +0.75 D. Sph. ⌒ +0.75 D. Cyl. x 90. V.A. = 20/20.

Add O.U. in bifocal form, +1.00 D. Sph.

This correction seemed to give little or no relief. The patient has returned to the ophthalmologist on several occasions but he claimed he was unable to improve it.

A non-cycloplegic examination at my office revealed the need for the following correction:

O.D. +3.75 D. Sph. V.A. = 20/20.
O.S. +3.50 D. Sph. V.A. =20/20.

This single vision correction was prescribed and the patient's symptoms disappeared. Within a ten day period the patient reported that her headaches and her insomnia were relieved and have never returned.

Case 6. Boy. Age 14. High school student, healthy in every respect, seems to be unusually strong and well developed for his age. He is five feet three inches tall and weighs 150 pounds. His complaint was that after using his eyes for a few minutes he becomes very nervous and developed ocular pains.

He was refracted under a cycloplegic six months before he came to me. As a result of this examination he was given:

O.D. —0.75 D.Cyl. x 90. V.A.=20/20.
O.S. —1.00 D.Cyl. x 90. V.A.=20/20.

The findings of the ophthalmoscope, of the external ocular examinations and of static retinoscopy were all negative. Ophthalmometer findings O.D. 0.25 Axis 90, O.S. 0.25 Axis 90. Tonicity tests showed no vertical imbalance either at distance or at near, but an esophoria of 12△ at a distance and 13△ at near. Dynamic skiametry developed O.U. +1.50 D.Sph. ⌒ +1.50 D.Cyl. Axis 180. The patient was given a temporary pair of supression lenses O.U. +0.75 D.Sph. with instruction that this temporary treatment correction be worn constantly for three weeks and return for a re-examination at that time. A re-examination revealed that the visual acuity with the naked eyes has improved and there was also a decrease in the amount of esophoria and astigmatism. The case was continued under observation, and suppression lenses given each time when so indicated by the examination. To date the patient is still wearing a plus correction and is perfectly comfortable, all annoying symptoms having disappeared upon removal of minus correction given under the use of a cycloplegic.

Case 7. Patient, male, age 18. High school student. Complained of an inability to do near-point work. Upon examination under non-cycloplegic manifest static and dynamic skiametry the patient was given:

O.D. +1.50 D.Sph. V.A. = 20/20.
O.S. +1.50 D.Sph. V.A. = 20/20.

This correction was prescribed for constant use. The patient reported within four weeks that he could use his eyes for any length of time with complete comfort. About a year later the patient called at the office and complained of the same trouble he had last year, and he stated that a couple of months ago he lost his glasses while in another city. He had his eyes refracted there under a cycloplegic but did not feel comfortable with the last pair of glasses; upon neutralizing his lenses I found that he was wearing +0.75 D.Sph. O.U. I again refracted him

but there was no material change in the findings since my first examination. The patient was again given +1.50 D.Sph. O.U. which gave him comfort. Here again is seen a case where under a cycloplegic examination the patient has been given just one-half of the amount of plus spherical correction compared with the prescription given under an examination without the use of a cycloplegic.

Case 8. Patient, student, male, age 13. This case was refracted by an ophthalmologist under a cycloplegic. As a result of this examination he received a pair of glasses which were as follows:

O.D. —1.00 D.Sph. V.A. = 20/20.
O.S. —1.00 D.Sph. V.A. = 20/20.

Ten months later this student was brought to me because his eyes were giving him a good deal of trouble. School work was impossible and the glasses seemed to make matters worse.

A non-cycloplegic examination revealed about a dioptre of latent hyperopia. The static skiametric findings were O.U. +0.75 D.Sph. while the dynamic gross finding was O.U. +2.50 D.Sph. The patient's uncorrected visual acuity was O.D. 20/40, O.S. 20/70. Patient has 15△ of esophoria. The usual orthoptic treatments for pseudo-myopia were carried out and within six months his distance correction was, uncorrected O.D. 20/20, O.S. 20/32. This case needed no glasses whatsoever, and has been made entirely comfortable without them by purely optometric means.

Case 9. Miss G. R., age 16. This student was brought to me after having a pair of glasses prescribed by an ophthalmologist. This correction was given after a complete cycloplegic refraction had been made. The glasses were:

O.D. —0.50 D.Sph. V.A. = 20/20.
O.S. —0.25 D.Sph. V.A. = 20/20.

Her uncorrected visual acuity was O.U. 20/40. A non-cycloplegic examination revealed both a latent hyperopia and an esophoria. I therefore prescribed:

O.D. +0.62 D.Sph. V.A. = 20/100
O.S. +0.62 D.Sph. V.A. = 20/100.

Despite the blur that the new glasses produced, the patient felt more comfortable at once and at the time of the last recheck her visual acuity had improved, with the correction to O.U. 20/32.

Case 10. Patient, male, barber, age 32. Symptoms of eyes becoming very tired and a numbness and dull pain in and about the back of his neck and lower jaw. He was using a pair of glasses that had been prescribed by an optometrist some year or so ago. These proved to be O.U. +0.75 D.Sph. After a careful non-cycloplegic examination the new formula proved to be O.U. +1.00 D.Sph. I was satisfied that his

difficulty was not due to this small change in the refraction. I suspected pathology to be the cause of his trouble and advised a dental examination. An X-ray revealed several abscessed teeth which the dental surgeon advised should be removed. I also advised the patient to have his teeth attended to first, and explained to him that the small change in the lens power would probably not relieve him of his symptoms. The patient did not follow my advice nor the advice of the dental surgeon, but instead consulted an ophthalmologist connected with one of our leading clinics. This specialist at once, as a result of a cycloplegic examination prescribed O.U. +1.00 D.Sph. This the patient used for about ten days and then reported back to the ophthalmologist that the trouble was getting worse. He rechecked the case and said that he was just having a little trouble getting used to the new glasses. Two weeks later he developed a facial paralysis. It was only then that the ophthalmologist suspected pathology and referred the patient to a dentist.

The argument has sometimes been advanced that an optometric non-cycloplegic refraction is not accurate because of the fact that perhaps the findings do not agree with those of a cycloplegic refraction. From the cases just referred to, and many others which could be given it can be seen that the reverse of this is also true, and in the light of much data in the hands of optometrists it would appear that there is much more danger of error in making a cycloplegic ocular examination than in making a non-cycloplegic one. The army experience of the writer bears this out as does the following case wherein the same patient was examined by two well known ophthalmologists, both using a cycloplegic, and both getting very different results within the same ten week period.

Case 11. Patient was an army man, 35 years of age. Applied to the eye department for an examination with a history of ocular fatigue. He was wearing O.U. +0.25 D.Sph. These had been prescribed at some Army post about two years prior to his coming to us. As he was a fairly important army man the head of our department decided to do the refraction himself. Colonel A therefore supervised the instalation of the cycloplegic himself and proceeded to do the examination, the entire matter taking two days. The formula he prescribed was as follows:

O.D. +0.75 D.Cyl. x 80.

O.S. +0.25 D.Sph. $\frown$ +0.62 D.Cyl. x 95.

Our patient wore this correction from February 17, 1918 until May 2, 1918, when he again returned with a report of continued discomfort. This time Major C refracted him, again under a cycloplegic and his findings were:

O.D. +1.25 D.Sph. $\frown$ +0.37 D.Cyl. x 75.

O.S. +2.00 D.Sph. $\frown$ +0.25 D.Cyl. x 100.

Looking at the findings on his record card and then looking at me at the close of his examination, Major C made the very pointed remark,

"this old prescription is just what you can expect from an optometrist without using a cycloplegic." He felt sure that the former prescription had been given our patient by some optometrist as a result of a non-cycloplegic refraction. A few moments later on I looked up our patient's record chart, just to be sure, and found the facts to be as I had stated them, that both examinations had been made by ophthalmologists, each using a cycloplegic, under the identical working conditions, on the same patient within ten weeks of one another.

Theobald[4] in his discussion of Subnormal Accommodative Power before the American Ophthalmological Society in 1894 reports that in a number of cases he examined, all being examined with a cycloplegic, he found that the patients were wearing the wrong correction although they were all formerly refracted under cycloplegics by reputable ophthalmologists.

Other cases similar to Case 11 could be cited. This one, however, will suffice to illustrate the point. I use this case not to show that either Colonel A or Major C are incompetent refractionists. As a matter of fact they are not. I knew both of them well, and have a high regard for their painstaking and conscientious refractive work. They are both scientists and masters in the art of refraction and are also regarded as high national authorities in the world of ophthalmology.

This discrepancy was not the result of indifference or carelessness. How then can we account for such a disagreement in refraction results obtained under the use of a cycloplegic by two equally capable refractionists? The only answer we can advance is the fact that in a small number of complicated refractive conditions the findings will vary from time to time whether or not a cycloplegic is used in the refraction. On this point I fully agree with Dr. A. S. Morton[7] surgeon to the Royal London Ophthalmic Hospital who states "When used in cases of active accommodation homatropine sometimes appears to render the accommodative effort spasmodic and uncontrollable, so that the result is quite untrustworthy." Pascal[6] holds similar views, that "At times the flabbiness of the crystaline lens and ciliary muscle produced by the drug may show less intrinsic refractive power and therefore more hyperopia than is actually present, even including the latent error. At other times the muscle may not respond fully to the effect of this drug, then only a small amount of the error will be revealed by the drug." He claims that we cannot uncover the latent hyperopia even under the use of atropin, for no two individuals react exactly alike to the same drug. We may also add that in some of the problem cases the same individual may react differently to the same drug at different times.

The writer is not describing these cases with the idea of contrasting the lack of knowledge of some ophthalmologists with the abundance of knowledge of optometrists. This is far from being the case. The reason I am bringing up these cases is because it may throw a little more light

upon what is actually taking place daily.

It is true, of course, that any ophthalmologist can look through his files and find a number of cases which were improperly refracted by some optometrist, but then the cause for the discrepancy they at once attribute to the fact that the optometrist performed the refraction without a cycloplegic. Little consideration is given to the fact that there are many other causes which may be responsible for the variation in the findings. It has been sufficiently established experimentally by Edwin Forbes Tait,[1] Kurtz,[2] Ferree and Rand,[3] that in refraction there is an element of variability present which is not eliminated by the use or non-use of cycloplegic. This has also been established to be a fact clinically by Theobald,[4] Watt,[5], Pascal,[6] Norton[7] and many others.

Other factors which have not been taken into consideration when we try to compare the findings of two different refractionists are the reliability, variability and the validity of the tests employed. The writer[8] in a recent research report has shown that there is a great difference in the degree of reliability and variability in the different tests and instruments utilized in the examination. The cases just mentioned in this paper are the more striking because they do not come from the office of the general medical practitioner who tries to refract along with his general practice.

They come from men with established reputations in their communities as well as in their professional organizations and are looked up to as leaders in their field. If these cases mentioned represent some of the refraction work done by some of the more competent group of the ophthalmologic profession, it would not require much of an imagination to conceive some of the refractive work which is being done by the "two and three months short course specialists." Is the public really safe in entrusting their sight to these men, and what is being done by "the powers that be" to lengthen the "short cut road to specialization" and thereby protect the public interest? What is being done to make it necessary to acquire a proper amount of training before a general practitioner can become an eye, ear, nose and throat specialist and how much time should one be required to spend in training before being considered eligible to practice upon the public any one branch of the specialties enumerated?

Dr. Edward Jackson,[9] dean of American Ophthalmology, admits that the medical schools do not provide the training necessary to prepare one to practice refraction, as may be seen from the following quotation: "But the most important thing the medical profession has to do is to provide for the adequate teaching of ophthalmology, including optometry, in the medical schools; to meet the needs of the practitioner of other branches of medicine, and to build up a definite class of practitioners especially trained to recognize and treat the defects and disorders of the eye. It is the failure properly to perform this duty toward the public

that is responsible for the optometry question, and the larger issue of a division in the medical profession. Ophthalmology can be learned without special schools or systematic courses of teaching. Medicine and surgery were so learned by apprenticeship for hundreds of years. But the apprentice system is gone from medicine, as it has gone from the mechanic arts. As matters stand now, the graduate, after a scanty introduction to ophthalmology in the medical school, is permitted to pick up ophthalmic knowledge and skill here and there from desultory reading, by study of chance cases, in the unsystematized clinics of postgraduate schools, from the courses of self-constituted teachers, and by a partial return to the apprentice system through assistantship in the eye clinic or private office."

The late Dr. Frank C. Todd, professor of clinical ophthalmology at the University of Minnesota, in a paper read before the section of ophthalmology of the American Medical Association as early as 1902, stated that "A proper training for refractive work alone requires an entire year of continuous study and experience." This statement was made 35 years ago when the science of refraction was in its infancy. In a discussion on the subject with the writer at one of the U. S. army base hospitals during the war Dr. Todd stated that at least two years should be spent on the study of refraction alone, and if he were alive today he would, no doubt, set the requirements still higher. This would exactly coincide with the writer's views. While we do not care to suggest the time which should be required in the preparation for opthalmology and oto-laryngology (being perfectly content to leave this matter to the group practicing these specialties), *we do maintain that no person can become a competent refractionist by taking a short course in refraction, no matter what other training and degrees that person may possess.*

It may be interesting to note at this point that a certain medical educator suggested as a solution of this problem that there be established a series of short courses in ocular refraction for the general practitioner. These courses to be of one month duration. While this would no doubt greatly increase the quantity of so-called eye specialists it would certainly very much lower the quality of the work and the public would be in the end the loser. The suggestion just referred to was not made by an ophthalmologist, but a medical educator who knew nothing of the problems involved in the matter of ocular refraction.

Optometry like dentistry must be studied by itself as a separate course and not be tagged on as an appendage to some other specialty or group of specialties or else both the science of optometry and the other specialty will suffer, to the ultimate disadvantage of the public. Dentistry has progressed more in America than in any other country on earth. Why is this so? The answer lies in the fact that in America dentistry has kept herself aloft from other professions. Here in America despite attempts of medical educators to merge it with medicine, dental educators and dental

societies have justly felt that, as a science, dentistry should be kept independent from medicine and not made just a minor and subservient branch of medical science, as it is in most European countries.

Optometry, and that means ocular refraction, likewise will attain the highest point of development when it continues to follow the same individual educational path as does dentistry. Optometry has been established as a profession for many years. She has her four year courses at various universities and colleges and these now extend to any interested student the opportunity of becoming a specialist in the art of ocular diagnosis and ocular refraction. We are told also that a two year pre-optometry course is soon to extend these courses to a six year level. Some of these educational plans are still new. Some still in the period of development, and some perhaps not too well rounded out, yet all making progress. And in this regard any friendly criticism or suggestion as to how they may be still further improved, from all those who have the genuine public welfare at heart will be welcomed.

It is true that optometry still has some of the old-timers within its ranks, but this is only a matter of a generation. The medical profession had the same problem to contend with. There are probably even today still a few medical doctors living who "read medicine" in a doctor's office. They, of course, came in before many medical schools existed and before the present medical laws. The same holds true about dentistry and law.

With the raising of the educational requirements only those will be admitted to the practice of optometry who are highly qualified and the doors will be closed to the unfit to practice refraction amongst the optometrists. Now we come again to this question, what about the medical profession? What is being done to prevent their unfit from entering the field of refraction? To quote again Professor Todd from a paper on "Higher Preparation in Ophthalmology," where he states in the closing paragraph: "Certainly there must be some means provided that the general practitioner and the layman may be able without payment of his 'pound of flesh' to distinguish a well prepared from an unsafe so-called 'specialist.' Ultimately, but not yet, laws will be enacted to protect the people from pretending specialists, but first we must define what is needed to prepare the specialist and prepare the courses for him to adequately provide himself with proper training."

These words were uttered by a great ophthalmologist and educator more than one-third of a century ago, but this great problem is no more solved by the medical profession (from a legislative and educational standpoint) today than it was at the beginning of this century.

Optometry has done precisely what Professor Todd suggested. We have defined what is needed to prepare the refractionists. We have secured laws in all states of the Union to keep out the unfit from practicing upon the public. We are constantly raising our educational re-

quirements. Now, will the medical profession co-operate "for the protection of the public" and prevent the unfit from practicing refraction under the cover of the general medical diploma?

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A FEW NOTES ON SOME CRITICAL COMMENTS DIRECTED TOWARDS THE PRACTICE OF OPTOMETRY*

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One of the common criticisms of optometry and the way the professional work is sometimes practiced is the comment that, in some commercial surroundings at least, the tendency is, for the optometrist to stress the sale of glasses. The entire emphasis of this type of practice being or at least seeming to be, to sell optical material and supplies. In nearly every city establishments of this kind can be found and in most of our daily newspapers announcements in the form of display advertisements will also be found, advising the public that for some small sum glasses can be obtained from these places of business. This type of practice is unsound from the standpoint of public well being and must be discontinued. Where the entire emphasis is placed on selling material, the patients well being is naturally pushed into the back ground and sales are made, if possible, irrespective of the patient's need for the article in question.

To be sure, only a very small portion of optometrists practice in this manner. But the few who do so occupy such a prominent place in the public eye, both as to the position of their places of business and the types of publicity material they use that to the casual observer they seem to typify at least a portion of the optometric world all out of importance to the numerical strength they really have.

It is this type of practice that makes the public think that the optometrist sells only glasses, the uninformed never stopping to think that to the great majority of optometrists the fee charged for the examination and the professional service charges collected by him for various forms of orthoptic treatment work form a considerable portion of his income and the actual dispensing of material is but a necessary adjunct to his work.

Many optometrists today supply no glasses at all. Their work is confined only to the examination and diagnosis of ocular disorders and the correction of neurological imbalances of the extra-ocular muscles by means of orthoptic treatments. These men merely write prescriptions

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and give these to their patients when glasses are required, having the patient take these to the optician of their choosing to get them filled and thus getting the glasses they require. These optometrists rely entirely on their professional fees for their livelihood and their numbers are growing each year.

This type of practice of course can be carried on only where suitable opticians are available to fill prescriptions. In smaller centers, the optometrists and the oculists have to do their own dispensing as the material must come to them by mail, and must be adjusted to the patient by the examiner himself. In fact it is estimated that more than one-half of all oculists and optometrists do their own dispensing and if this matter of material is kept in its proper place the practice has nothing to condemn it. Dispensing material is only harmful when it becomes *the important* end of a practice.

And in this connection it might be well also to point out here too that optometrists are not the only offenders when it comes to letting the sale of glasses dominate their practices. In many cities, oculists and ophthalmologists are also guilty of these practices, their advertisements appearing in the daily press along side of those of their optometric brethren. Philadelphia, Chicago and St. Paul are noticeable examples of cities having their advertising oculists and there are many other such examples of medical men who are commercializing the practice of optometry, which could be added. These practices must go, irrespective of who does them. Medical boards should attend to the oculist offenders, and Optometric boards should attend to optometrists who disregard public welfare by the indiscriminate sale of glasses.

Another criticism of optometry has to deal with the optometrist's ability to diagnose pathology. Just why this should be so is a question I cannot answer as the optometrist's training has been the very best in this field. The majority of pathology affecting the eyes is revealed by use of the ophthalmoscope. A recent graduate of one of the large eastern medical schools told me that he had had the use of an ophthalmoscope for but a few hours of actual use during his entire medical course, and that he still did not know how to use it, whereas an optometric student uses an ophthalmoscope clinically for two years before he graduates, and all during this time he is studying ocular pathology as well as general pathology.

This last criticism probably originates because of some of the careless work done by the commercial optometrist, who in a rush to high pressure the unsuspecting patient into buying a pair of glasses overlooks an occasional case of eye pathology. The writer has been informed that in some of these commercial establishments ocular examinations are made in from ten to twenty minutes. This is, of course, much too small a time to do this work and would result in some obviously bad diagnostic work. But again the writer objects to having an entire profession con-

demned because of the acts of but a few of its practitioners. Optometrists as a body are the best trained men in the world today to differentiate the normal eye from the one suffering from pathology, and because of the inferior work of a few of the commercial men, feel this last criticism to be unjustified.

The Utopia of every profession is to have all its members practicing their profession in a strictly ethical manner, divorced from all commercialism. That is also true of optometry. Not so many years ago practically all medical men owned their own drug stores. At that time the doctors charged, not for their services, but for the medicine made from their prescriptions, which they compounded in their own drug store. During that period their money was derived from the sale of medicine, as the examination of the patient was free. As time went on the physician began to charge for the examination as well as for the drugs, thus deriving a second source of income. As time advanced still further, the physicians became more ethical and charged only for their services, giving the patient a prescription to be filled at the drug store. Still later, the physician sold the drug stores, and had separate offices. We can still see some remnants of this in the homopathic physician, who still dispenses medicine, after his examination of the patient. Optometry as well as medicine is now endeavoring to reach that point of utopia, where the optometrist will be able to practice ethically. That is, the optometrist will be practicing in an office and not in a store, charging for his services, and examinations, and fitting glasses if he so desires as an aid to corrective vision.

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TRAINING THE OPTOMETRIC SPECIALIST*

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The fine work that is being done in universities and optometric colleges by educators who are devoting their lives to the important work of training optometrists is sometimes overlooked by the practitioner in the field. Busy as he is with his many diagnostic and clinical refractive problems he sometimes forgets or overlooks the large debt he owes to those men who frequently at no little sacrifice to themselves and their families, are accomplishing much that assures us as optometrists a lasting place in the professional life of this civilization.

Optometric education as it stands today is on its high plane only because these men and women have set their standards high and have had the courage to make the necessary sacrifices and do the needed work which had to be done to make that standard a real achievement. An achievement in educational circles to which they can point with pride and one which has and will continue to give to the people of America a professionally trained specialist as an optometrist who can perform the work for which he was trained and for which he is licensed.

To illustrate the type of training now being given the student optometrist in the four year professional course in optometry I am quoting from the 1937 Bulletin of the Massachusetts School of Optometry[1] from which the following outline of their training activity is taken. It should be noted here that the entire four year period is devoted to subjects having a direct bearing on ocular work and also that a particular emphasis is placed on clinical training and refracting room experience. This course is not presented because it is the best course, in the writer's belief. In fact, there are other courses in other educational centers which, in some respects I like better, but I am presenting it because it is typical of what optometric educators are doing today and it illustrates the fine type of training now being given in our many educational institutions. The course now referred to leads to a Doctor's degree in Optometry.

*Submitted for publication August 15, 1937.

[1] The Massachusetts School of Optometry is a private Optometric College now in its forty-third year. Located at Boston. It is one of a number of outstanding independent professional schools now training optometrists. This work can also be taken at certain Universities among which the Optometry Course at Columbia University, New York City is the oldest, it now being in its twenty-ninth year.

CURRICULUM

First Year

First Semester		Second Semester	
Subject	*Hours*	*Subject*	*Hours*
General Anatomy	90	General Anatomy	90
Algebra	90	Algebra	90
Geometry	36	Geometry	36
Trigonometry	18	Trigonometry	18
Physics	54	Physics	54
Biology	36	Biology	36
Practical Optics	18	Practical Optics	18
Clinical Observation	36	Clinical Observation	36
Physical Education	36	Physical Education	36
Total	414	Total	414

Second Year

First Semester		Second Semester	
Subject	*Hours*	*Subject*	*Hours*
Theoretic Optics	54	Theoretic Optics	54
Theoretic Optics Laboratory	36	Theoretic Optics Laboratory	36
Physiological Optics	54	Physiological Optics	54
Physiological Optics Lab.	36	Physiological Optics Lab.	36
Ocular Anatomy & Histology	72	Hygiene	36
Hygiene	36	General & Ocular Physiology	54
General & Ocular Physiology	54	General Pathology	36
General Pathology	36	Practical Optics	36
Practical Optics	36	Theoretic Optometry	36
Theoretic Optometry	36	Mehcanical Optics Laboratory	36
Mehcanical Optics Laboratory	36	Clinical Observation	36
Clinical Observation	36		
Total	522	Total	450

THIRD YEAR

FIRST SEMESTER		SECOND SEMESTER	
Subject	*Hours*	*Subject*	*Hours*
Physiological Optics	54	Physiological Optics	54
Physiological Optics Lab.	36	Physiological Optics Lab.	36
Theoretic Optics	54	Theoretic Optics	54
Theoretic Optics Laboratory	36	Theoretic Optics Laboratory	36
Practical Optics	36	Practical Optics	36
Theoretic Optometry	54	Theoretic Optometry	54
Practical Optometry	36	Practical Optometry	36
Ocular Pathology	36	Ocular Pathology	36
Clinical Practice	90	Clinical Practice	90
Mechanical Optics Laboratory	72	Mechanical Optics Laboratory	72
Total	504	Total	504

FOURTH YEAR

FIRST SEMESTER		SECOND SEMESTER	
Subject	*Hours*	*Subject*	*Hours*
Physical Optics	36	Neurology	36
Physical Optics Laboratory	36	Applied Anatomy	36
Physiological Optics	36	Physiological Optics	18
Ocular Pathology	36	Ocular Pathology	18
Practical Optics	36	Practical Optics	36
Clinical Conference	90	Clinical Conference	108
Mechanical Optics Laboratory	36	Mechanical Optics Laboratory	36
Clinical Practice	244	Clinical Practice	244
Theoretic Optometry	54	Theoretic Optometry	54
Total	604	Optometric Jurisprudence	18
		Total	604

OUTLINE OF COURSES

FIRST YEAR

Mathematics

ALGEBRA: Review of elementary algebra, after which the student is taught advanced algebra, especially those operations which are most useful in his work.

First Semester, 5 hours—Second Semester, 5 hours, per week.

GEOMETRY: Review of elementary Geometry, after which the

course includes those parts that are necessary in order to enable the student to understand the different problems in various phases of Optics.

First Semester, 2 hours—Second Semester, 2 hours, per week.

TRIGONOMETRY: The course includes such topics as, Functions of multiple angles, Fundamental relations, Solution of oblique triangles, Inverse trigonometric functions and trigonometric equations.

First Semester, 1 hour—Second Semester, 1 hour, per week.

GENERAL ANATOMY: Introduction. General outline of the following: Osteology, myology, arterial system, venous system, lymphatic system, organs of the thorax, organs of the abdomen, genito-urinary organs, various glands of the body, surface anatomy of various parts of the body, digestive apparatus, nervous system.

First Semester, 5 hours—Second Semester, 5 hours, per week.

BIOLOGY: Introduction. The biological sciences. The cell. Embryology. Histology. Comparative anatomy. Genetics. Organic evolution adaptation. Evidences for organic evolution. Causes of organic evolution. Biology of Man.

First Semester, 2 hours—Second Semester, 2 hours, per week.

PHYSICS: Introduction. Time. Space. Mass Motion. Measurements. Work and Energy. Kinetics. Attraction and Potential. Gravitation. Matter. Solids. Liquids. Gases. Heat. Sound. Ether Waves. Electricity and Magnetism.

First Semester, 3 hours—Second Semester, 3 hours, per week.

PRACTICAL OPTICS: Introduction. The purpose of this course is to familiarize new students with the various types of ordinary lenses used in Optometric practice. It is given also with the intention of maintaining the student's interest. Lectures and Laboratory demonstrations. Lenses: Definitions, types and terminology, Methods of numbering, Radii of curvature, Focal length, Dioptral power and formulae. Diagrams showing the path of rays through simple lenses. Addition of lenses. Ordinary forms of spherical lenses. Base curves. Simple cylinders. Ordinary axis notation. Compounds: Flat lenses, Method of placing ℞ on cross, Method of finding ℞ from cross. Determination of type of ℞ by inspection.

First Semester, 1 hour—Second Semester, 1 hour, per week.

CLINICAL OBSERVATION: The object of this course is to familiarize the Freshman with professional surroundings. He observes what takes place and when familiar with simple apparatus is assigned elementary phases of clinical work.

First Semester, 2 hours—Second Semester, 2 hours, per week.

PHYSICAL EDUCATION: All Freshmen, unless excused by a physician, are required to attend gymnasium classes. At the beginning of

the season and several times during the year, each Freshman is subjected to a physical efficiency test.

First Semester, 2 hours—Second Semester, 2 hours, per week.

SECOND YEAR

PRACTICAL OPTICS: This course is given in connection with the Mechanical Optics Laboratory, wherein the student receives practical work in the subject matter given in the classroom. The course includes first, a continuation of analysis of lenses as given during the Freshman year. Description and analysis of flat lenses. Transposition. Description and curves on Toric lenses. Brief discussion of plate glass refraction. Theoretic and practical location of optical centers. Lens marking and axis finding. Prisms and prismatic effect. Cylinders with axes crossed at various angles. Risley prisms.

First Semester, 2 hours—Second Semester, 2 hours, per week.

MECHANICAL OPTICS LABORATORY: Neutralizing. Centering and marking of various kinds of ordinary lenses. The practical use of various types of centering apparatus and axis markers. As the student advances in his work, he is given more complicated lenses for analysis. The course includes simple transposition of lenses, curves on Meniscus and Toric lenses. Ophthalmic lens grinding.

First Semester, 2 hours—Second Semester, 2 hours, per week.

GENERAL PATHOLOGY: General conception and forms of morbid states. Nature, extension and sources of disease. General symptomatology, diagnosis, and prognosis. Duration, course and termination of disease. Agony. Apparent death. Causes of death. General etiology. Predisposing and exciting causes. General pathological anatomy and physiology.

First Semester, 2 hours—Second Semester, 2 hours, per week.

OCULAR ANATOMY AND HISTOLOGY: This course includes Gross Anatomy, Histology and Embryology of the eyeball and its appendages. Microscopical examination of normal tissue. The lectures are illustrated by many lantern slides, models, charts and diagrams. Each student is required to prepare and submit drawings of all structures. To this is added dissection of animal eyes.

First Semester, 4 hours, per week.

CLINICAL PRACTICE: This includes the practical application of tests outlined in the classroom. These tests are made on fellow students. In addition, each member of his class is assigned to assist upper classmen in their clinical practice.

First Semester, 2 hours—Second Semester, 2 hours, per week.

THEORETIC OPTOMETRY: History of Optometry, elementary tests and descriptions of various Optometric apparatus. Definition of ordinary terms used in Optometric practice. Value of Optometry to

mankind. Description and use of the Ophthalmoscope, trial case, keratometer and skiascope. Subjective refraction. Objective refraction by Static Skiametry. This course is supplemented by clinical observation and practice of students on each other. Much time is devoted to the study of the Ophthalmoscopic picture and the use of practice eyes.

First Semester, 2 hours—Second Semester, 2 hours, per week.

HYGIENE: Introduction to Hygiene and value to Optometry. Sources of infection. Dissemination of infective agents. Contact transmission of diseases. Diseases transmitted solely by contact. Diseases usually transmitted by contact. Diseases frequently transmitted by contact. General measures of disease control. Disinfectants and disinfection. Excreta disposal. Relationship of water to health and disease. Water purification. Production and inspection of milk. Milk as a route of infection. Foodstuffs as routes of infection. Insects as carrying agents of disease. Lower animals as sources of infection. Deficiency diseases. Diseases due to excess. Occupational diseases. Diseases arising from pregnancy, labor and puerperal state. Diseases transmitted from parent to offspring. The hygiene of childhood. Air, heating and ventilation. Personal hygiene. Public health.

First Semester, 2 hours—Second Semester, 2 hours, per week.

PHYSIOLOGICAL OPTICS: Discussion of the various refractive conditions of the eye. Effect of these conditions on light. Problems in accommodation. Cardinal points. Optical constants. The reduced eye of Donders. Size of retinal image. Axes and angles of the eye. Preliminary discussion of convergence and measurement of same. Optics of the crystalline lens. The pupil. Entopic phenomena.

First Semester, 3 hours—Second Semester, 3 hours, per week.

PHYSIOLOGICAL OPTICS LABORATORY: A series of experiments on the subject matter covered in the classroom. Each student is required to complete all experiments and record the same in the regular Laboratory book.

First Semester, 2 hours—Second Semester, 2 hours, per week.

THEORETIC OPTICS: Outline of course. Photometry. Laws of single refraction as applied to flat and curved refracting surfaces. Laws of reflection as applied to plane and spherical mirrors. Mirror formulae. Thick mirrors. Related problems. Thin lenses.

First Semester, 3 hours—Second Semester, 3 hours, per week.

THEORETIC OPTICS LABORATORY: A series of experiments on the subject matter covered in the classroom. Each student is required to complete all experiments, and record the same in the regular Laboratory book.

First Semester, 2 hours—Second Semester, 2 hours, per week.

GENERAL AND OCULAR PHYSIOLOGY: Introduction to Physiology—Definition. Application and value to Optometry. The Cell

in detail. Metabolism. The Physiology of Muscle. Chemistry of Muscle. Experimental phenomena of muscle and nerve contraction. The phenomena of conduction in nerve fibres. Properties of nerve fibre. The nature of the nerve impulse and the nutritive relations of the nerve fibre and the nerve cell. Physiology and chemistry of the various nutritive systems. Physiology and chemistry of the blood stream. Osmetic Pressure. The pulse and heart beat. The vasometer nerves and their physiological activities. Physiology of the composition and formation of Lymph. The physiology of respiration. Digestion and secretion. Liver and Spleen. Kidney and Skin. Ductless glands. Nutrition and heat production regulation. Vitamins and inorganic salts. Reproduction of both Male and Female. Heredity and Growth. Diffusion and Osmosis. Chemistry and physiology of blood corpuscles. Properties of nerve cells. Reflex actions. The general physiology of cerebrum and its motor functions. Sense and association areas in the cortex. Sympathetic nervous system and sleep. The special senses. The Eye as an Optical instrument. Dioptrics of the Eye. The physiological properties of the Retina. Visual stimuli and visual sensation. Binocular vision. Physiology of the Rhodopsin. Physiological Functions of the Rods and Cones.

First Semester, 3 hours—Second Semester, 3 hours, per week.

THIRD YEAR

OCULAR PATHOLOGY: A study of diseases of the eyeball and its appendages. Manifestations of diseases elsewhere in the body presenting ocular symptoms are considered. The course attempts to classify and give a clear conception of the recognition and prognosis of eye pathology. Many lantern slides and charts are used to illustrate the cases covered in the classroom, and clinical cases presented before the class.

First Semester, 2 hours—Second Semester, 2 hours, per week.

PRACTICAL OPTOMETRY: This course is given in connection with Clinical Optometry. It includes the practical application of the methods of examination and instrumentation outlined in the course in Theoretic Optometry. The reports of the examinations made in the clinic by members of this Class are thoroughly discussed and analyzed.

First Semester, 2 hours—Second Semester, 2 hours, per week.

MECHANICAL OPTICS LABORATORY: A continuation of the work outlined for the Sophomore Year, and later advanced work along the same lines. To this is added the use of apparatus, such as Lloyd Axometer, Lensometer, and Colmoscope, marking and cutting lenses, hand edging, ophthalmic lens grinding.

First Semester, 4 hours—Second Semester, 4 hours, per week.

THEORETIC OPTOMETRY: This course includes a review of the Sophomore Year, and then various forms of ametropia are discussed from a viewpoint of etiology, diagnosis and treatment. In addition, re-

fractive technique and procedure including theory and practice of dynamic skiametry, cross-cylinder, duochrome refraction, accommodative and convergence relationship, extra-ocular muscle balance, ductions, measurement of stereopsis and advanced work in visual fields is thoroughly discussed. Special attention is directed to co-ordination of the various refractive procedures with the view of arriving at a diagnosis, method of orthoptic treatment and prism therapy. At the completion of this year's work the student is equipped to conduct a thorough visual survey with the exception of strabismic cases.

First Semester, 3 hours—Second Semester, 3 hours, per week.

CLINICAL PRACTICE: During the first part of this course the Juniors act as assistant clinicians to the Seniors. When they have advanced sufficiently they make examinations under the guidance of Seniors. During the summer months they are required to act as clinicians for a minimum period of two weeks.

First Semester, 5 hours—Second Semester, 5 hours, per week.

PHYSIOLOGICAL OPTICS: Principles of Ophthalmometry. Optical System of the Universal, C-I and B. & L. instrument. Optic principles of Skiametry. Optometers. Aberrations, Astigmatism. Optic principles of Ophthalmoscopy. Radiant Energy and the Ocular Tissues. Physio-chemistry of Vision. Stimulus of Vision. Phosphenes. Color Mixing. Photopic and Scotopic luminosity curves.

First Semester, 3 hours—Second Semester, 3 hours, per week.

PHYSIOLOGICAL OPTICS LABORATORY: A series of experiments on the subject matter covered in the classroom. Each student is required to complete all experiments and record the same in the regular laboratory book.

First Semester, 2 hours—Second Semester, 2 hours, per week.

THEORETIC OPTICS: A continuation of the Sophomore course. Also a study of the Optics of various Optical instruments such as the telescope and the microscope, etc. Thick lenses. Thick and thin prisms. Achromatic and Aplanatic systems.

First Semester, 3 hours—Second Semester, 3 hours, per week.

THEORETIC OPTICS LABORATORY: A series of experiments on the subject matter covered in the classroom. Each student is required to complete all experiments and record the same in the regular laboratory book.

First Semester, 2 hours—Second Semester, 2 hours, per week.

PRACTICAL OPTICS: History of the manufacture of glass and of the American Optical and Bausch & Lomb Optical Companies. Lloyd axometer. Frame measurements. Types of frames and mountings to be used in various cases. Zylonite frames.

First Semester, 2 hours—Second Semester, 2 hours, per week.

FOURTH YEAR

OCULAR PATHOLOGY: Continuation of the Pathology as outlined under the Junior year. The relation between Optometrist and Physician. Many lantern slides and charts are used to illustrate the cases covered in the classroom, and clinical cases presented before the class.

First Semester, 2 hours—Second Semester, 2 hours, per week.

PHYSICAL OPTICS: Theories of Light: Newtonian, Huygenian, Electro-magnetic, Quantum. Velocity of Light: Romer's method, Michaelson's method. Interference: Discussion of conditions necessary for interference, Young's Pinhole experiment, Fresnel's Bi-prism and Double Mirror experiment. Polarization: Principal types of polarized light, Methods for obtaining polarization, Brewster's Law. Diffraction: Brief discussion of the diffraction pattern, Diffraction gratings and their spectra. Double Refraction: Wave velocities in uniaxial crystalline media, Positive and negative crystals, Special consideration of the Wollaston Prism. Miscellaneous phenomena: Mirage, Rainbow (primary and secondary), Luminescence. Wave tracing: Formation of the reflected image by wave front treatment, Consideration of lenses.

First Semester, 2 hours, per week.

NEUROLOGY: This course includes a consideration of the general anatomy and physiology of the spinal cord and brain, including a review of the embryology of the nervous system. Common neurological diseases, including brain tumor, brain abscess, paralysis, meningitis, etc., are considered.

Second Semester, 2 hours, per week.

APPLIED ANATOMY: A detailed review of Ocular Anatomy and the Ocular Adnexa. Review of Ocular Embryology. Review anatomy of the vital organs, kidneys, brain, lungs.

Second Semester, 2 hours, per week.

PRACTICAL OPTICS: A continuation of frame measurement and adjusting. Lens measure. Lensometer and Vertometer. Tinted lenses. Special kinds of glass and lenses. Colmoscope and other special apparatus. Various kinds and types of bifocals, trifocals. Corrected lenses.

First Semester, 2 hours—Second Semester, 2 hours, per week.

CLINICAL CONFERENCE: This course includes the discussion and analysis of various cases examined in the clinic. The aim of this course is to drill the student in the proper analysis of data, in the treatment of cases by glasses and other methods.

First Semester, 5 hours—Second Semester, 6 hours, per week.

MECHANICAL OPTICS LABORATORY: This course includes a continuation of the course of the Junior Year. Much time is devoted to actual work in facial measurements and adjustments. Edging and mount-

ing. Grinding of bifocals and other special types of lenses.

First Semester, 2 hours—Second Semester, 2 hours, per week.

CLINICAL PRACTICE: As this is a most important course, the student is required to devote the minimum hours to clinical work and likewise to be on call for special clinical work outside the regular hours. All Seniors are clinicians, and make complete examinations of every patient assigned to them. Before graduation each student is required to pass in written reports and thorough analysis of not less than twenty cases examined by him. As a complete written analysis of each case requires several hours, a student is given the above minimum to report though he will have examined many more during the year.

First Semester, 14 hours—Second Semester, 14 hours, per week.

OPTOMETRIC JURISPRUDENCE: This course covers instructions on legal questions that arise in a professional practice. It also includes the business management of a professional practice.

Second Semester, 1 hour, per week.

PHYSICAL OPTICS LABORATORY: A series of experiments on the subject matter covered in the classroom. Each student is required to complete all experiments and report the same in the regular laboratory book.

First Semester, 2 hours, per week.

PHYSIOLOGICAL OPTICS: A study of the various divisions of the sense of sight; light, form and color. Scotopia and Photopia. Various psychological phenomena. A study of various defects of light, form, and color sense. Theories of color vision.

First Semester, 2 hours—Second Semester, 1 hour, per week.

THEORETIC OPTOMETRY: The work of this year is devoted to etiology, diagnosis, and treatment of strabismus. This course is supplemented by class presentation of clinical strabismic patients. Complete discussion of the apparatus concerned with treatment of strabismus is presented. A continuation of the theoretical analysis of the results of each regular and special test in a visual survey is conducted. The psychology, physiology and instrumentation concerned with orthoptic training is presented and practiced in the clinics on out-patients.

The latter part of this year's work is set aside for the discussion of the more recent advances in Optometric instrumentation, procedures, and visual survey and analyses. Patient control is presented to familiarize the student with the problems that may arise when contact is made with them.

First Semester, 3 hours—Second Semester, 3 hours, per week.

It might also be pointed out that the faculty and physical equipment in each of the optometrical educational centers in this country and

in Canada are under the constant supervision of a rating committee set up by the International Association of State Boards of Optometry, working in close cooperation with the Educational Committee of the American Optometric Association and the American Academy of Optometry. Every University course and each private optometric school is in close touch with these groups and all are striving to maintain the highest possible standards of educational efficiency. To such men as Sheard, Pegram, Southall, Woll, Fitch, Tait, Needles, Hutchinson, Klein, Fry, and many others, the profession owes a great debt. Theirs is a lasting work which has been well started and which will continue to improve as time goes on. They have made a lasting impression on a profession which will ever remember them with gratitude.

DR. CAREL C. KOCH
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HISTORY AND SYMPTOMS

No one individual phase of an optometric examination is of greater importance to the general success of the entire procedure than is the taking of the case history and the recording of symptoms complained of by the patient. As a matter of fact the success of much that we do in prescribing for patients is attributable to the knowledge gained in taking the history of the case and for this reason a sufficient period of time must be set aside at the start of each examination to enable the patient to give the examiner in some detail, all of the information which he should have prior to doing his work, to thus enable him to cover whatever ground is essential.

The first step in taking a case history is the actual recording, in the patient's own words, of his or her chief or principal complaint. This should be written out in great detail on the record chart, just as the patient tells it to the optometrist. This is the reason for the patient seeking an eye examination and it is to give relief from this main symptom that the optometrist must center his interest. This chief complaint should be written out in full, never paraphrased, as it may be necessary to refer to it at a future date when only the fullest and most complete report will be of value.

After the chief complaint has been recorded the optometrist then questions the patient in some detail along the following four lines: (1) Symptoms produced by the use of the eyes; (2) Accidents or diseases which have or may have affected the eyes; (3) Family history, and (4) Previous treatment which this patient may have received from some other practitioner.

To get information pertaining to symptoms produced by the use of the eyes it may be necessary to ask the patient a number of the following questions: When reading or doing office work, do your eyes become tired? Does type blur? If so, how long after starting reading? Has there been any noticeable change during the past few years? Or during the past few months? Has your distance vision fallen off or do you see distance objects as well now as you did a year or six months ago? Is there an inability to use the eyes? An inability to concentrate or a lack of interest in school work? Do your eyes itch and burn? Are they subject to inflammation and discharge? Do they become congested? Do they feel scratchy? Do you experience headaches, and if you do, at what intervals and in what part of the head? Do you see floating specks before your eyes? Do you suffer from vertigo, nausea and dizziness? Do your eyes water when doing some particular task? These leading questions should be put to all patients and their answers will lead the examiner to further lines of inquiry.

If the patient complains of pain in the eye a very searching inquiry should be made. This is a symptom which should never be regarded lightly. While the pain complained of may be a typical asthenopia due to eyestrain and the fatigue which results from an uncorrected refractive error, it may also be due to an inflammatory glaucoma, an iritis, keratitis, cyclitis or some orbital involvement. Pain in the eyes is sometimes also confused with the pain experienced by patients suffering from a sinusitis and many patients who are suffering from a neuralgia also complain of this symptom.

When headaches are complained of, an eyestrain may be suspected. This is one of the common symptoms of eyestrain. Yet it must be understood that many disturbances cause headaches. In other words, all headaches are not of ocular origin. Those that do originate in the eyes are due as a rule to astigmia, presbyopia, accommodative disorders, imbalances of the extra-ocular muscles, hyperopia, and anisometropia in the order named. Myopia is rarely if ever the cause of headache. Ocular headaches may appear as an intra-ocular pain or as a pain in and around the eyes and temples and in the front portion of the head. Or they may appear as a pain in and around the back of the neck. Both of these locations are favorite seats of headache due to some ocular origin. In cases of this kind the pain is experienced as a rule during or after the use of the eyes, especially when they have been used for close work.

Other ocular causes for what appear to the patient to be frequent

headaches are ocular neuroses, migraine and neuralgia. In cases suffering from a history of frequent headaches, the examination is not complete without an investigation of the patient's temperature, blood pressure, urine and a very searching external ocular inspection as well as a carefully made ophthalmoscopic examination. In these cases the fields of vision should be charted also, for both form and color for indications of increased intracranial pressure. I am suggesting taking the patient's temperature in these cases of frequent headaches as these headaches are occasionally due to unsuspected low grade infections, and in these cases one frequently finds the patient running a slight temperature, but in no way aware of it other than perhaps not feeling quite "fit."

For information regarding accidents and diseases which may have affected the eyes the patient is asked whether or not he or she has experienced any accidents wherein the eyes or an eye was involved. Questions regarding possible sources of focal infections such as the condition of the teeth, tonsils and sinuses are included, as well as an inquiry into the ability of the patient to eat various foods as well as to the regularity of elimination. These all have a very important bearing on the patient's well being and frequently throw considerable light on the symptoms complained of by the patient.

The family history is of importance in recording the case history and symptoms, and should never be omitted, particularly during the first visit of a patient to the office. The existence among members of the several previous generations as well as the immediate family of such involvements as myopia and strabismus, or the occurrence of cataract or glaucoma or blindness from unknown causes, all have a bearing on the case, both from a psychological standpoint as well as from an hereditary one. Also the prevalence of allergic disturbances, neurotic tendencies, the possibility of exposure to tuberculosis, the presence of heart involvements or rheumatism or diabetes all are of particular importance. In the matter of the past history of the patient one should inquire as to diseases affecting the eyes and also such general diseases as whooping cough, scarlet fever and measles as these infections are such as to bring out latent weaknesses of the eyes.

The fourth portion of the case history has to do with the previous treatment the patient has received at the hands of other practitioners. Here a record should be made of the previous glasses now in use, as well as a record of whatever orthoptic treatment work the patient has undergone, along with any other material which may present itself. The optometrist should be careful, however, to make no disparaging remarks as to the correctness of former glasses or treatment work no matter how incorrect the work might have been.

In some cases much more minute questioning is necessary than in others to get the information required, yet this must be done and once it has been accomplished, the facts brought out in taking the case history

must not be lost sight of during the entire period of the examination, or the results will not be up to the high level of work which should characterize an optometric examination. Carel C. Koch.

* * * * *

SPECIAL REPORT

MEMBERSHIP QUALIFICATIONS IN ALL OPTOMETRIC SOCIETIES SHOULD BE RAISED*

Ralph M. Abel, Opt.D.
St. Louis, Mo.

On all sides of us—in our publications, at our conventions, in the daily mail, we hear the cry of ethics, professionalism, join the local, join the national, attend this meeting, attend that meeting, go to the educational clinics! It seems to me that these mass pleas have accomplished little, if any, good; due to the fact that they have been so overdone to the extent that instead of the individual seeking to join the society, the society seeks the individual with utter disregard for his qualifications, his creed of optometry, or with any discrimination between capable and incompetent optometrists. While this is not true of all optometric societies, it is true of most.

Gentlemen, optometry deserves criticism as it is judged in a measure at least by the type of optometry that greets the casual observer's eye—the department, jewelry, and the drug store optometrists who flaunt their advertising ballyhoo to the four winds, the men who are so merchandise minded that they place the transient value of a pair of glasses over the constant value of a pair of human eyes, ruthlessly prescribing optical material without much caring about the individual's welfare. If that be optometry, I want none of it!

But I know, and you know, that there does exist in ever growing numbers men who have the courage of their convictions, and the character to back up their actions, who want to place optometry upon the pedestal of professionalism that it should rightfully occupy in the public's mind.

It seems to me that instead of besieging every man who calls himself an optometrist to become affiliated, or associated, with one or more of our many organizations or societies, that the individual should want above all things to be allowed to become affiliated with an optometric organization because it represents all that is good and clean, and is just a bit particular about the caliber of men that comprise its membership.

*Submitted for publication August 20, 1937.

It is said that "in union there is strength" and also that a "chain is only as strong as its weakest link," in these trite axioms, I believe, there is shown conclusively some of the many cancerous sores of optometry which are exposed by taking in and allowing to become members in some of our societies, men who have no conception whatsoever of professional eye care. By allowing these persons to participate in optometric organizations we have allowed them to insidiously undermine the very things for which we have sacrificed and striven to gain; judicious legislation, elimination of advertising, and eradication of corporate practices engaging in optometry and other businesses engaging in optometry and other businesses at the same time in the same store or office.

Our state boards should be thoroughly investigated. The men who represent us in such an important position should be above reproach, they should be optometrists only, and practitioners of the highest caliber. Our state board examiners should be men who are not afraid to do what is right for our future, they should prosecute violators to the fullest extent of the law when such cases are brought to their attention, these boards should not be made up of optometric political hacks, but of men selected for their integrity, for their fearlessness, and for their love of the optometric profession. It seems to me that the state society should have some word to say about the selection of the men who comprise the state board of examiners, even though these selections are in the end made by the governor.

In our colleges and universities the profession of optometry is painted to the student as possessing rich luscious fruits that are just waiting to be plucked after graduation, very little, if anything, is said about the lurid picture which is emblazoned to the skies through the medium of glowing neon lights that advertise the "professional" services of Dr. "X." and a pair of glasses for the sum of $2.98.

This is the optometry that Mr. Average Citizen sees and it is in his hand that the future praise and acceptance or condemnation of optometry is contained. We should in some way acquaint these youngsters with the problem that will confront them upon graduation when they seek to earn an honorable and professional living amongst these leeches. It is to these embryo optometrists that we must look, in order to properly direct their footsteps along the paths of what is right and honorable, and just, and professional, so that they may be a credit to the title Doctor of Optometry because they will be the future members of our societies and state boards and it is to them that we must look to carry on the work for which professional optometry now stands.

I hope that it may not be construed that I am advocating an optometric utopia—far from it. I am merely trying to voice an individual expression with the hope that it may strike a responsive chord here and there so that the vast good that optometry does, the many great and far-reaching results that have been obtained from optometric research, the

memories of the fine, keenly intelligent men who have devoted their lives for the principles on which optometry is based shall not be swept into the swirling muck of oblivion by the practices of those few parasitical dervishes who seek to undermine, like termites, the foundations of a great and powerful profession.

If every optometrist could only realize that he is selling only one thing—his individual skill and knowledge which comprise the basis of his professional service, something on which the price could not be put—something on which no one man can set an arbitrary price, and something for which the individual will be glad to pay, feeling that the services which he obtains are incomparable because the question of the price of a pair of glasses did not arise, and what he is purchasing is skill and knowledge and not a piece of merchandise that is always in the throes of competition.

I firmly believe that unless we seek to raise the standards of the membership of all of our local optometric societies; improve the personnel of our state boards; properly direct the footsteps of embryo optometrists into the right channels and offer them enough inducements to keep them there, we justifiably deserve criticism from outside sources.

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ABSTRACTS

THE AVOIDANCE OF DYNAMIC ACCOMMODATION THROUGH THE USE OF A BRIGHTNESS-CONTRAST THRESHOLD—M. Luckiesh and F. K. Moss, Amer. J. Ophth., Vol. 20, No. 5, May, 1937.

The authors suggest a method of preventing the use of dynamic accommodation without the use of a cycloplegic. They name it The Sensitometric Method. This method they claim is even superior to the use of cycloplegic, because the latter inhibits both dynamic and tonic accommodation, while the new method they suggest inhibits dynamic accommodation only, leaving the tonic unaffected.

In their technique they utilize the principle of contrast between the object and its background. They maintain that the usual threshold visual acuity stimulus is invariably a stimulus to accommodation until the visibility threshold is reached.

The results obtained in an experiment conducted by the authors proves the validity of their assumption. J. I. K.

ON THE ATTAINMENT OF SIMULTANEOUS BINOCULAR VISION IN ORTHOPTIC TRAINING—M. Luckiesh, F. K. Moss and R. M. Hall, J. A. O. A., March, 1937.

The authors realize that there are practical difficulties encountered in attempting to balance the visibility of binocular test-objects, utilized in orthoptic apparatus, by means of controlled illumination of the targets, because it requires large changes in objective illumination in order to produce relatively small changes in visual efficiency. To overcome this difficulty the authors devised a clinical apparatus, which consists of two circular colorless filters with specific gradients of density which may be placed before the orthoptic instrument in any desired angular position. By using these filters it is possible to equalize easily the brightness of the visual fields due to absorption and to a reduction in the contrast between the objects of regard and their background.

While the authors used these filters with the Rotoscope, they can be used just as effectively with any other orthoptic instrument to help obtain single binocular vision. J. I. K.

EDITORIAL NOTICE TO CONTRIBUTORS

The American Journal of Optometry is a monthly journal, published in annual volumes of about five hundred pages of reading matter each, illustrated where necessary, by cuts in the text.

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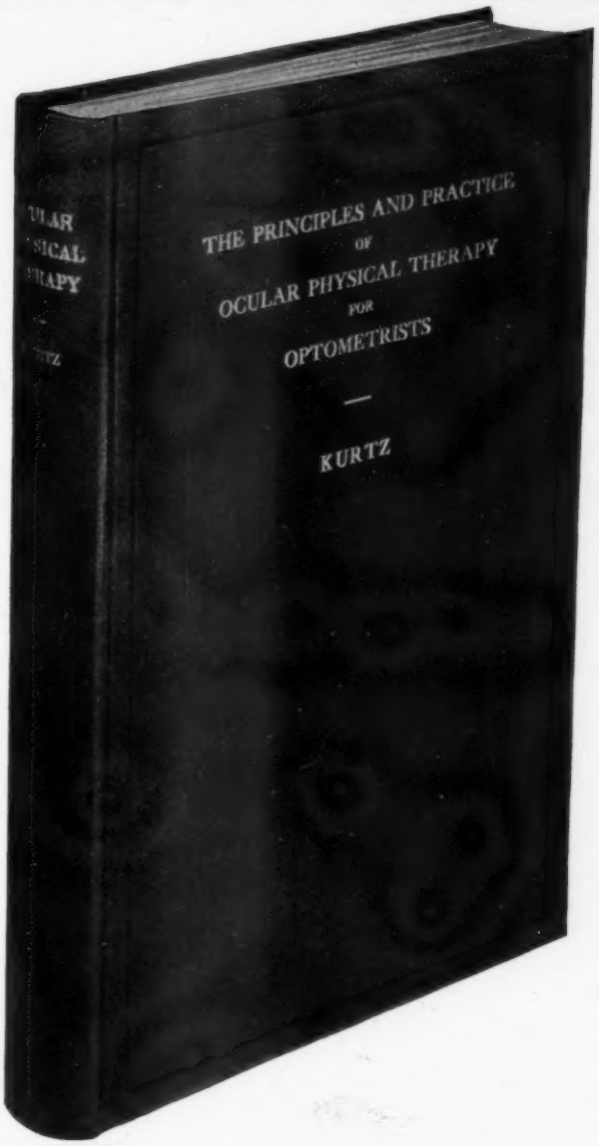

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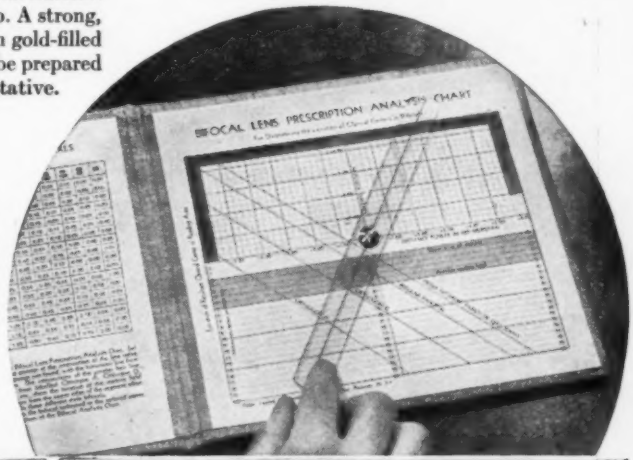

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